face of the ſtove, againſt which they preſs it, to force out great part of the water through the wires. The heat of the wall ſoon evaporates the reſt, and a boy takes off the dried ſheet by rolling it up. The ſide next the ſtove receives the even poliſh of the ſtucco, and is thereby better fitted to receive the impreſſion of fine prints. If a degree of ſizing is required, a decoction of rice is mixed with the ſtuff in the vat.

Thus the great ſheet is obtained, ſmooth and ſized, and a number of the European operations ſaved.

As the ſtove has two poliſhed ſides, and there are two vats, the ſame operation is at the ſame time performed by two other men at the other vat; and one fire ſerves.

N°. IV.

QUERIES *and* CONJECTURES *relating to Magnetiſm, and the Theory of the Earth, in a Letter from* Dr. B. FRANKLIN, *to* Mr. BODOIN,

DEAR SIR,

Read Jan. 15, 1790. I RECEIVED your favours by Meſſrs. Gore, Hilliard and Lee, with whoſe converſation I was much pleaſed, and wiſhed for more of it; but their ſtay with us was too ſhort. Whenever you recommend any of your friends to me, you oblige me.

I want to know whether your Philoſophical Society received the ſecond volume of our Tranſactions. I ſent it, but never heard of its arriving. If it miſcarried, I will ſend another. Has your Society among its books the French Work *ſur les Arts & les Metiers?* It is voluminous, well executed, and may be uſeful in our country. I have bequeathed it them in my will; but if they have it already, I will ſubſtitute ſomething elſe.

Our

Our ancient correſpondence uſed to have ſomething philoſophical in it. As you are now more free from public cares, and I expect to be ſo in a few months, why may we not reſume that kind of correſpondence? Our much regretted friend Winthrop once made me the compliment, that I was good at ſtarting game for philoſophers, let me try if I can ſtart a little for you.

Has the queſtion, how came the earth by its magnetiſm, ever been conſidered?

Is it likely that *iron ore* immediately exiſted when this globe was firſt formed; or may it not rather be ſuppoſed a gradual production of time?

If the earth is at preſent magnetical, in virtue of the maſſes of iron ore contained in it, might not ſome ages paſs before it had magnetic polarity?

Since iron ore may exiſt without that polarity, and by being placed in certain circumſtances may obtain it, from an external cauſe, is it not poſſible that the earth received its magnetiſm from ſome ſuch cauſe?

In ſhort, may not a magnetic power exiſt throughout our ſyſtem, perhaps through all ſyſtems, ſo that if men could make a voyage in the ſtarry regions, a compaſs might be of uſe? And may not ſuch univerſal magnetiſm, with its uniform direction, be ſerviceable in keeping the diurnal revolution of a planet more ſteady to the ſame axis?

Laſtly, as the poles of magnets may be changed by the preſence of ſtronger magnets, might not, in ancient times, the near paſſing of ſome large comet of greater magnetic power than this globe of ours have been a means of changing its poles, and thereby wracking and deranging its ſurface, placing in different regions the effect of centrifugal force, ſo as to raiſe the waters of the ſea in ſome, while they were depreſſed in others?

Let me add another queſtion or two, not relating indeed to magnetiſm, but, however, to the theory of the earth.

Is not the finding of great quantities of ſhells and bones of animals, (natural to hot climates) in the cold ones of our preſent world, ſome proof that its poles have been changed? Is not the ſuppoſition that the poles have been changed, the eaſieſt way of accounting for the deluge, by getting rid of the old difficulty how to diſpoſe of its waters after it was over? Since if the poles were again to be changed, and placed in the preſent equator, the ſea would fall there about 15 miles in height, and riſe as much in the preſent polar regions; and the effect would be proportionable if the new poles were placed any where between the preſent and the equator.

Does not the apparent wrack of the ſurface of this globe, thrown up into long ridges of mountains, with ſtrata in various poſitions, make it probable, that its internal maſs is a fluid; but a fluid ſo denſe as to float the heavieſt of our ſubſtances? Do we know the limit of condenſation air is capable of? Suppoſing it to grow denſer *within* the ſurface, in the ſame proportion nearly as we find it does *without*, at what depth may it be equal in denſity with gold?

Can we eaſily conceive how the ſtrata of the earth could have been ſo deranged, if it had not been a mere ſhell ſupported by a heavier fluid? Would not ſuch a ſuppoſed internal fluid globe be immediately ſenſible of a change in the ſituation of the earth's axis, alter its form, and thereby burſt the ſhell, and throw up parts of it above the reſt? As if we would alter the poſition of the fluid contained in the ſhell of an egg, and place its longeſt diameter where the ſhorteſt now is, the ſhell muſt break; but would be much harder to break if the whole internal ſubſtance were as ſolid and hard as the ſhell.

Might not a wave by any means raiſed in this ſuppoſed internal ocean of extremely denſe fluid, raiſe in ſome degree

gree as it paſſes the preſent ſhell of incumbent earth, and break it in ſome places, as in earthquakes? And may not the progreſs of ſuch wave, and the diſorders it occaſions among the ſolids of the ſhell, account for the rumbling ſound being firſt heard at a diſtance, augmenting as it approaches, and gradually dying away as it proceeds? A circumſtance obſerved by the inhabitants of South-America in their laſt great earthquake, that noiſe coming from a place, ſome degrees north of Lima, and being traced by enquiry quite down to Buenos Ayres, proceeding regularly from North to South at the rate of—Leagues per minute, as I was informed by a very ingenious Peruvian whom I met with at Paris.

N°. V.

Explanation of a ſingular phenomenon, firſt obſerved by Dr. FRANKLIN, *and not hitherto ſatisfactorily accounted for. In a Letter from* Mr. R. PATTERSON, *to* Dr. B. RUSH.

SIR

Read Oct. 5, 1787. I REMEMBER, ſeveral years ago to have read, in one of Dr. Franklin's philoſophical tracts, an account of a ſingular phenomenon, obſerved when a veſſel, containing oil and water, is put in motion—Thus if a glaſs tumbler, for inſtance, about two thirds filled, with equal parts of water and oil, be moved gently backwards and forwards in the hand; or, ſuſpended by a cord, be made to ſwing like the pendulum of a clock, the ſurface of the water in contact with the oil, which floats upon it, will be thrown into a violent wave-like commotion, while the upper ſurface of the oil will be comparatively placid and even.

The Doctor obſerves, that having ſhewn this experiment to a number of ingenious perſons, " thoſe who are but